

HPS - Hantavirus Pulmonary Syndrome

HPS-C COMPLICATIONS

OUTCOME: The patient/family will understand the potential consequences of exposure to and/or infection caused by the hantavirus.

STANDARDS:

1. Discuss the common or significant complications that may occur after infection with the hantavirus, such as cardiorespiratory failure and death.
2. Discuss if treatment is obtained before the disease progresses to acute respiratory distress, the chances of surviving are greatly increased.

HPS-DP DISEASE PROCESS

OUTCOME: The patient/family will have a basic understanding of the pathophysiology, symptoms, and prognosis of infection with the hantavirus.

STANDARDS:

1. Explain that deer mice (along with cotton rats in the southeastern states and the white-footed mouse in the northeast) carry “hantaviruses” that cause hantavirus pulmonary syndrome (HPS). Explain rodents shed the virus in their urine, droppings, and saliva and the virus is mainly transmitted by people when they breathe in air contaminated by the virus.
2. Explain that following aerosol exposure and deposition of the virus deep in the lung, infection may be initiated. The virus attacks the lungs and infects the walls of the capillaries, making them leak, flooding the lungs with fluid.
3. Incubation time is not positively known, but it appears that symptoms may develop between one and five weeks after exposure.
4. Explain that symptoms include:
 - a. Early universal symptoms: fatigue, fever, and muscle aches, especially in the large muscle groups – thighs, hips, back, and sometimes shoulders.
 - b. Other early symptoms: headaches, dizziness, chills, and abdominal problems, such as nausea, vomiting, diarrhea, and abdominal pain (about half of all HPS patients experience these symptoms).
 - c. Late symptoms (4 to 10 days): coughing and shortness of breath, with the sensation of a “tight band around the chest and a pillow over the face” as the lungs fill with fluid.
5. Discuss that even though the mortality rate is near 50% (2004 data), the sooner an infected person gets medical treatment, the better the chance of recovery. Explain

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the need to see the doctor immediately for exposure to rodents and development of symptoms of fever, deep muscle aches and severe shortness of breath.
Emphasize the need to tell your physician that you have been around rodents.

HPS-EQ EQUIPMENT

OUTCOME: The patient/family will have an understanding and demonstrate (when appropriate) the proper use and care of equipment.

STANDARDS:

1. Explain the use of equipment utilized to monitor the patient.
2. Explain that the various alarms are to alert the medical personnel of the patient's status and/or the function of the equipment.
3. Emphasize, as necessary, that electrodes and sensors must be left in place in order for the equipment to function properly.
4. Encourage the patient/family to ask questions if they have concerns regarding equipment readings.
5. Emphasize the importance of not tampering with any medical equipment.

HPS-FU FOLLOW-UP

OUTCOME: The patient/family will understand the importance of follow-up and make a plan to keep follow-up appointments.

STANDARDS:

1. Discuss the importance of follow-up care.
2. Discuss the procedure for obtaining follow-up appointments.
3. Emphasize that appointments should be kept.

HPS-INT INTUBATION

OUTCOME: The patient/family will have a basic understanding of endotracheal intubation, as well as, the risks, benefits, alternatives to endotracheal intubation and associated factors affecting the patient.

STANDARDS:

1. Explain the basic procedure for endotracheal intubation, including the risks and benefits of endotracheal intubation and the adverse events that might result from refusal.
2. Discuss alternatives to endotracheal intubation, including expectant management, as appropriate.

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3. Explain that the patient will be unable to speak or eat while intubated.

HPS-L LITERATURE

OUTCOME: The patient/family will receive literature about HPS.

STANDARDS:

1. Provide patient/family with literature on HPS.
2. Discuss the content of the literature.

HPS-MNT MEDICAL NUTRITION THERAPY

OUTCOME: The patient and family will have an understanding of the specific nutritional intervention(s) needed for treatment or management of HPS.

STANDARDS:

1. Explain that Medical Nutrition Therapy (MNT) is a systematic nutrition care process provided by a Registered Dietitian (RD) that consists of the following:
 - a. Assessment of the nutrition related condition.
 - b. Identification of the patient's nutritional problem.
 - c. Identification of a specific nutrition intervention therapy plan.
 - d. Evaluation of the patient's nutritional care outcomes.
 - e. Reassessment as needed.
2. Review the basic nutrition recommendations for the treatment plan.
3. Discuss the benefits of nutrition and exercise to health and well-being.
4. Assist the patient/family in developing an appropriate nutrition care plan.
5. Refer to other providers or community resources as needed.

HPS-P PREVENTION

OUTCOME: The patient/family will understand that HPS can be prevented by eliminating or minimizing contact with rodents.

STANDARDS:

1. Explain that rodents tend to be found in the home, cabin, workplace, orchards, out buildings, hay fields, or open fields.
2. Discuss the importance of keeping a clean and healthy home and yard to eliminate sources of nesting materials and sites.

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3. Discuss the need to seal up the house to keep rodents out of the home. Examine for any gaps around roofing, attic spaces, vents, windows, and doors as well as for gaps under the sink and locations where water pipes come into the home.
4. Discuss the common signs that point to a rodent problem (e.g., rodent droppings, rodent nests, food containers that have been “chewed on,” gnawing sound, or an unusual musky odor).
5. Discuss the mode of transmission of HPS is inhalation of infected rodent feces, so it is important to not stir up dust by sweeping up or vacuuming up droppings, urine, or nesting material.
6. Discuss precautions to take when cleaning up rodents and rodent droppings including wearing rubber or plastic gloves and spraying dead rodents, urine, or droppings with a disinfectant or a mixture of bleach water. Explain that contaminated gloves must be disinfected with a disinfectant or soap and warm water before taking them off.
7. Explain the need to thoroughly wet contaminated areas with a disinfectant to deactivate the virus. The most general purpose disinfectants and household detergents are effective. A solution prepared by mixing 1½ cups of household bleach in 1 gallon of water may be used in place of commercial disinfectant. Take up contaminated materials with a damp towel, then mop or sponge the area with disinfectant.
8. Discuss that when going into cabins or outbuildings that have been closed up for awhile, they should be opened and aired before cleaning due to the high probability of rodent infestation and the possibility of droppings and/or urine.

HPS-TE TESTS

OUTCOME: The patient/family will understand the test(s) to be performed, including indications and impact on further care.

STANDARDS:

1. Explain the test ordered.
2. Discuss the necessity, benefits, and risks of the test to be performed, as appropriate, including possible complications that may result from not having the test performed.
3. Explain how the test relates to the course of diagnosis and treatment.
4. Explain any necessary preparation for the test.
5. Discuss the meaning of the test results, as appropriate.

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HPS-TX TREATMENT

OUTCOME: The patient/family will understand the possible treatments that may be available for HPS.

STANDARDS:

1. Explain to patient/family that there is currently no virus-killing drug that is effective against HPS.
2. Explain that there is no specific treatment or “cure” for hantavirus infection. If the infected individuals are recognized early and admitted to intensive care, the chance for recovery is better.
3. Emphasize that treatment is supportive care.

HPS-VENT MECHANICAL VENTILATION

OUTCOME: The patient/family will understand mechanical ventilation, as well as, the risks, benefits, alternatives to mechanical ventilation and associated factors affecting the patient.

STANDARDS:

1. Explain that the patient must be intubated with an endotracheal tube or tracheostomy tube in order to receive mechanical ventilation.
2. Explain the basic mechanics of mechanical ventilation, including the risks and benefits of receiving mechanical ventilation and the adverse events which might result from refusal.
3. Discuss alternatives to mechanical ventilation, including expectant management, as appropriate.
4. Explain that the patient will be unable to speak or eat while intubated and receiving mechanical ventilation.
5. Explain that the patient will be sedated during intubation and the initiation of mechanical ventilation.
6. Discuss the possibility that the patient may require restraints to prevent accidental extubation.